

Section: **01** (Vassileva) / **03** (Callele) / **05** (Koehn)

Name: _____

Student Number: _____

Signature: _____

University of Saskatchewan
Department of Computer Science
CMPT 116 Midterm Examination - CLOSED BOOK
Nov 1, 2001

Total Marks: 35 marks

Time: 60 Minutes

Instructions:

PLEASE ANSWER QUESTIONS 1 through 17 ON THE PROVIDED OPTIC SCAN SHEET. Darken with pencil (HB preferred) the circle that corresponds with your answer for each of these questions. Be sure to include your name and student number on the top of the OPTIC SCAN sheet (and on the top of this question sheet).

THE REMAINDER OF THE QUESTIONS (QUESTIONS 18 through 20) ARE TO BE ANSWERED ON THIS QUESTION SHEET. If you don't have enough space, write on the back of the page, indicating clearly that your answer is continued there. Be sure to pace yourself according to the marks allotted to each question. ... good luck!!

I. True / False Questions (1 mark each): TO BE ANSWERED ON THE OPTIC SCAN SHEET.

1. In C++, `upperLimit2` and `iUpperLimit2` are both valid variable names.
(A) TRUE (B) FALSE
2. Suppose variable `X=3`, `Y=1`, `Z='a'`. Given these values, the following expression evaluates to false. `(Z=='Z') || ((Y<=X-Y) && !(Y==0))`
(A) TRUE (B) FALSE
3. A program that does not contain any syntax errors will successfully compile.
(A) TRUE (B) FALSE
4. Execution of the following C++ code segment will display : `iNum is 10`

```
int iNum = 5;
if (iNum = 10)
    cout << "iNum is 10";
else cout << "iNum is not 10";
```


(A) TRUE (B) FALSE
5. Integer values can be read via the keyboard or file input into variables of type float.
(A) TRUE (B) FALSE

6. Using a pass-by-reference parameter, the called function can obtain the initial value of an argument as well as change the value of the argument.
- (A) TRUE (B) FALSE

II. Multiple Choice Questions (1 mark each): TO BE ANSWERED ON THE OPTIC SCAN SHEET.

7. In C++, preprocessor commands begin with a:
- (A) `//`
(B) `{`
(C) `#`
(D) `cout`
(E) `$`
8. An ordered set of steps that describes the solution to a given problem in finite time is known as a(n):
- (A) syntax
(B) semantics
(C) flowchart
(D) pseudocode
(E) algorithm
9. An argument is:
- (A) a variable without a data type
(B) when the compiler disagrees with your source code
(C) the data passed to a function
(D) a value with an undetermined point
(E) the assignment of an incorrect data type to a variable
10. The user can interactively terminate a program data entry loop through the use of a(n)
- (A) semicolon
(B) scope resolution operator
(C) sentinel
(D) break statement
(E) pass-by-reference parameter
11. After the following statements have executed, what is the value of **dSize**?
- ```
double dSize = 3.9146;
dSize = (int) dSize;
```
- (A) 3  
(B) 3.0  
(C) 3.9146  
(D) 4  
(E) 4.0

12. Which of the following is the proper heading for a function that has an integer parameter and returns a value of type double?

- (A) `int foo(x)`
- (B) `foo(int x, double y)`
- (C) `void foo(int x)`
- (D) `double foo(int x)`
- (E) `int foo (double x)`

13. What is true about `x >= 0` in the following line of code?

```
while (x >= 0) {cout<< "Enter new number: "; cin >>x;}
```

- (A) `x >= 0` is an expression
- (B) `x >= 0` is an argument to a function
- (C) `x >= 0` is a compound statement
- (D) `x >= 0` is an operator
- (E) `x >= 0` is a variable declaration

14. Suppose you want to write a function that rotates (`B=A`, `C=B`, `A=C`) the contents of 3 floating point variables A, B, C. What would be a good header for this function?

- (A) `int iRotate (float A, float B, float C)`
- (B) `iRotate (A, B, C)`
- (C) `int iRotate (&A, &B, &C)`
- (D) `float iRotate(A, float &B, float &C)`
- (E) `void iRotate (float &A, float &B, float &C)`

15. How many stars will the following fragment output?

```
int i;
int j;

for (i = 0; i < 12; i = i+4)
 for (j = 0; j <= 5; j = j+1)
 cout << "*";
```

- (A) 5
- (B) 15
- (C) 18
- (D) 60
- (E) 66

16. What is the order in which the following functions are called? Assume that the necessary function prototypes/declarations appear above function main.

```
void main (void) {
 john();
}

void john (void) {
 ringo();
 paul();
}

void paul (void) {
 ringo();
}

void george (void) {
 /* here comes the sun */
}

void ringo (void) {
 george();
}
```

- (A) john, ringo, george, paul, ringo, george
- (B) main, john, ringo, paul
- (C) main, john, paul, george, ringo
- (D) john, paul, george, ringo, main
- (E) main, john, ringo, george, paul, ringo, george

17. What arithmetic expression is implemented by the following recursive function?

```
int FunctionRecurse(int X, int Y) {
 if (Y == 0)
 return 1;
 else
 return X * FunctionRecurse(X, Y-1);
} // end fn. FunctionRecurse
```

- (A)  $X * Y!$
- (B)  $X^N * Y!$
- (C)  $X * Y^N$
- (D)  $X! * Y-1$
- (E)  $X^Y$

### III. Analyzing & Writing Code: TO BE ANSWERED ON THIS QUESTION SHEET.

18. (3 marks) What is the value of **x** for the given values of **i** *after* this code fragment has executed? Assume that the code fragment is executed anew for each value of **i**.

```
x = 10;
if (i > 5)
 if (i > 10)
 x = i * 10;
 else
 x = i * 5;
```

Indicate the value of variable **x** in the space below for each specific value of variable **i**.

|      | Initial Value of <b>i</b> | Value of <b>x</b> |
|------|---------------------------|-------------------|
| i)   | i = 7                     |                   |
| ii)  | i = 3                     |                   |
| iii) | i = 14                    |                   |

19. (8 marks) The following C++ program is supposed to allow a user to enter in a list of years (integer values, terminating list by a negative number) and should identify all of the *leap years* entered as well keep a count of the total number of leap years entered by the user. Note that a leap year is a year that is evenly divisibly by 400 OR a year that is evenly divisible by 4 but not evenly divisible by 100. Fill in the blanks to complete the program.

```
#include <iostream.h>
int LeapYear(int);
main ()
{
 int iYear, _____;
 cout << "Enter a year to determine if the year is a leap year (or
 enter a negative number to quit): ";
 cin >> iYear;
 while (_____)
 {
 if (LeapYear(_____) == _____)
 {
 cout << " * Is a leap year * " << endl;
 _____;
 } // end if stmt.
 cout << "Enter another year (or a negative number to quit): ";
 cin >> iYear;
 } // end while loop
 cout << "\nThe total number of leap years entered is: "
 << iCount << endl;
} // end fn. Main

// Function LeapYear returns 1 if a given year is a leap year and
// returns 0 if a given year is not a leap year
int LeapYear (_____)
{
 if (((iYear % 400) == 0) ||
 (_____))
 return 1;
 else
 _____;
} // end fn. LeapYear
```

20. (7 marks)

- a) A number is said to be *prime* if it has no divisors other than 1 and the number itself. Construct a C++ function named **Prime** that returns 1 if a given number is prime and 0 if it is not a prime number.

- b) Illustrate how you would call/invoke and use the function **Prime** that you defined in part (a). Provide a short C++ code segment to answer this question.

/\* ~ ~ ~ ~ ~ *The End* ~ ~ ~ ~ ~ \*/